

REISSUE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No.: 4006-003

Date: October 1, 1998

REISSUE APPLICATION TRANSMITTAL

Honorable Commissioner of Patents  
and Trademarks  
Washington, DC 20231

Sir:

Transmitted herewith is the reissue of U.S. Patent No. 5,722,050 issued on February 24, 1998.

Inventors: Jinsaun CHEN

For: TRANSMITTER-RECEIVER SYSTEM FOR USE IN AN AUDIO EQUIPMENT

Enclosed are the following:

1. SPECIFICATION, CLAIMS and DRAWINGS
  - (a) ☒ 3 pages of specification
  - ☒ 8 pages of claims
  - ☒ 1 page of Abstract
  - (b) ☐ sheets of formal drawings
  - ☒ No changes in the drawings upon which the original patent was issued are to be made. Therefore, in accordance with 37 CFR §1.174, please find attached, in the size required for original drawings:
    - ☒ a copy of the printed drawings of the patent
    - ☐ a photoprint of the original drawings.
2. DECLARATION and POWER OF ATTORNEY
  - ☒ 2 pages of declaration and power of attorney
3. PRELIMINARY AMENDMENT
  - ☐ attached
4. OFFER TO SURRENDER THE ORIGINAL LETTERS PATENT IN ACCORDANCE WITH 37 CFR §1.178
  - ☒ attached
5. LETTERS PATENT
  - ☐ original letters patent attached
  - ☐ declaration that original letters patent lost or inaccessible

10/01/98  
J-535 U.S. PTO

JC542 U.S. PTO  
09/164630  
10/01/98

09/164630-100198

6. TITLE

In accordance with 37 CFR §1.171, this application for reissue is accompanied by:

☐ a certified copy of an abstract of title

or

☐ an order for an abstract of title

7. INFORMATION DISCLOSURE STATEMENT

☐ attached

8. PRIORITY - 35 USC §119

☐ Priority of Patent Application filed on in is claimed under 35 USC §119.

☐ The certified copies have been filed in prior application Serial No. filed on .

9. FEE CALCULATION (37 CFR §1.16 (i) and (j))

Claims as Filed:

	Column 1	Column 2	Small Entity		Other Than Small Entity	
For:	No. Filed	No. Extra	Rate	Fee	Rate	Fee
Basic Fee:	1		\$305.00	\$305.00	\$610.00	\$
Total Claims:	37 - 20 =	17	x 7 =	\$119.00	x 14 =	\$
Indep. Claims:	3 - 3 =	0	x 32 =	\$	x 64 =	\$
Fee for Title Report						\$
			TOTAL	\$424.00	TOTAL	\$

10. SMALL ENTITY STATUS (if applicable)

☒ A verified statement that this filing is by a small entity is attached.

11. ASSIGNMENT INFORMATION (if applicable)

☐ The prior application is assigned of record to.

12. METHOD OF PAYMENT OF FEES

☐ Charge Deposit Account No. 03-1045 in the amount of \$. Two copies of this request are attached.

☒ Check attached in the amount of \$424.00. For the following fees:

☒ 37 CFR §1.16 (filing fees)

☒ 37 CFR §1.16 (presentation of extra claims)

☐ 37 CFR §1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application.

☐ 37 CFR §1.17 (application processing fee)

☐ 37 CFR §1.18 (issued fee at or before mailing of Notice of Allowance pursuant to 37 CFR §1.311(b).

367007-06-04-9150

Variable	Mean	Standard deviation	Minimum	Maximum
Age	34.2	10.5	20	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	15.2	5.8	5	35
Health status	0.8	0.4	0	1
Smoking status	0.3	0.5	0	1
Alcohol consumption	0.2	0.4	0	1
Exercise frequency	0.5	0.5	0	1
Stress level	0.7	0.5	0	1
Life satisfaction	0.6	0.5	0	1
Depression score	0.4	0.5	0	1
Loneliness score	0.5	0.5	0	1
Quality of life score	0.7	0.5	0	1
Healthcare utilization	0.6	0.5	0	1
Health insurance status	0.9	0.3	0	1
Healthcare access	0.8	0.4	0	1
Healthcare cost	10.5	3.2	5	20
Healthcare satisfaction	0.7	0.5	0	1
Healthcare quality	0.8	0.4	0	1
Healthcare accessibility	0.9	0.3	0	1
Healthcare affordability	0.7	0.5	0	1
Healthcare effectiveness	0.8	0.4	0	1
Healthcare safety	0.9	0.3	0	1
Healthcare equity	0.7	0.5	0	1
Healthcare transparency	0.8	0.4	0	1
Healthcare accountability	0.9	0.3	0	1
Healthcare responsiveness	0.8	0.4	0	1
Healthcare patient-centeredness	0.9	0.3	0	1
Healthcare cultural competence	0.8	0.4	0	1
Healthcare community engagement	0.7	0.5	0	1
Healthcare leadership	0.9	0.3	0	1
Healthcare governance	0.8	0.4	0	1
Healthcare innovation	0.7	0.5	0	1
Healthcare sustainability	0.8	0.4	0	1
Healthcare resilience	0.9	0.3	0	1
Healthcare adaptability	0.8	0.4	0	1
Healthcare flexibility	0.9	0.3	0	1
Healthcare inclusivity	0.8	0.4	0	1
Healthcare diversity	0.9	0.3	0	1
Healthcare equity	0.8	0.4	0	1
Healthcare justice	0.9	0.3	0	1
Healthcare fairness	0.8	0.4	0	1
Healthcare integrity	0.9	0.3	0	1
Healthcare honesty	0.8	0.4	0	1
Healthcare trustworthiness	0.9	0.3	0	1
Healthcare reliability	0.8	0.4	0	1
Healthcare consistency	0.9	0.3	0	1
Healthcare predictability	0.8	0.4	0	1
Healthcare stability	0.9	0.3	0	1
Healthcare security	0.8	0.4	0	1
Healthcare safety	0.9	0.3	0	1
Healthcare risk management	0.8	0.4	0	1
Healthcare crisis response	0.9	0.3	0	1
Healthcare disaster preparedness	0.8	0.4	0	1
Healthcare emergency response	0.9	0.3	0	1
Healthcare business continuity	0.8	0.4	0	1
Healthcare recovery plan	0.9	0.3	0	1
Healthcare communication	0.8	0.4	0	1
Healthcare information management	0.9	0.3	0	1
Healthcare data management	0.8	0.4	0	1
Healthcare technology use	0.9	0.3	0	1
Healthcare digital transformation	0.8	0.4	0	1
Healthcare innovation	0.9	0.3	0	1
Healthcare research and development	0.8	0.4	0	1
Healthcare clinical trials	0.9	0.3	0	1
Healthcare regulatory compliance	0.8	0.4	0	1
Healthcare accreditation	0.9	0.3	0	1
Healthcare certification	0.8	0.4	0	1
Healthcare standards	0.9	0.3	0	1
Healthcare best practices	0.8	0.4	0	1
Healthcare quality improvement	0.9	0.3	0	1
Healthcare patient safety	0.8	0.4	0	1
Healthcare infection control	0.9	0.3	0	1
Healthcare waste management	0.8	0.4	0	1
Healthcare environmental health	0.9	0.3	0	1
Healthcare occupational health	0.8	0.4	0	1
Healthcare public health	0.9	0.3	0	1
Healthcare epidemiology	0.8	0.4	0	1
Healthcare biostatistics	0.9	0.3	0	1
Healthcare clinical research	0.8	0.4	0	1
Healthcare translational research	0.9	0.3	0	1
Healthcare evidence-based practice	0.8	0.4	0	1
Healthcare clinical guidelines				

Respectfully submitted,

Donald C. Casey  
Registration No. 24,022

99 Canal Center Plaza  
Suite 300  
Alexandria, Virginia 22314  
(703) 548-2131 DCC:slv  
**Date:** October 1, 1998

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Re: Reissue Application of U. S. Patent No. 5,722,050

Issued: February 24, 1998

Inventor: Jinsaun Chen

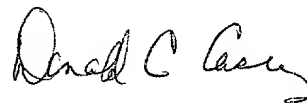
**OFFER TO SURRENDER PATENT**

Honorable Commissioner of Patents  
and Trademarks

Sir:

Applicant hereby offers to surrender the original Letters Patent No. 5,722,050  
upon an indication of allowable subject matter in this reissue.

Respectfully submitted,



Donald C. Casey  
Registration No. 24,022

99 Canal Center Plaza  
Suite 300  
Alexandria, Virginia 22314  
(703) 548-2131 DCC:slv  
**Date:** October 1, 1998

RECEIVED OCT 1 1998

# TRANSMITTER-RECEIVER SYSTEM FOR USE IN AN AUDIO EQUIPMENT

## BACKGROUND OF THE INVENTION

The present invention relates to a transmitter-receiver system for use in an audio equipment which comprises a transmitter unit installed in the audio equipment to transmit its output signal, and a receiver unit installed in an earphone to receive transmitted signal from the transmitter unit.

In order not to interfere with others while listening the music of an audio equipment, an earphone shall be used. However, when an earphone is used and connected to the output terminal of the audio equipment, the limitation of the length of the electric wire of the earphone, the movement of the user is confined to a limited area. Furthermore, when an audio equipment is installed, the electric wires between the amplifier and the speakers may be disorderly exposed to the outside. If to keep the electric wires from sight, the installation cost of the audio equipment will be high.

## SUMMARY OF THE INVENTION

The present invention has been accomplished to provide a transmitter-receiver system which eliminates the aforesaid problems. It is one object of the present invention to provide a transmitter-receiver system which can be installed in the amplifier and speakers of an audio equipment so that the sound signal of the amplifier can be transmitted to the speakers for out put wirelessly. It is another object of the present invention to provide a transmitter-receiver system which can be installed in an audio equipment and an earphone so that the user can listen to the music of the audio equipment without interfering other persons. It is still another object of the present invention to provide a transmitter-receiver system which eliminates the use of a complicated matching device by using an inductance type transmitting antenna, which reduces the floating of frequency. It is still another object of the present invention to provide a transmitter-receiver system which consumes low voltage. It is still another object of the present invention to provide a transmitter-receiver unit which automatically cuts of battery power supply when the audio equipment does no work. It is still another object of the present invention to provide a transmitter-receiver unit which adopts a dual oscillation frequency regulating circuit for the transmitter unit as well as the receiver unit so that the range of the frequency can be broadly adjusted without being limited by the installation of a SAW as did in conventional methods, in which the output of the first intermediate frequency can be within the range from 10.7 MH to 100 MH; the second frequency mixing and the second local oscillation may be eliminated when desired. It is still another object of the present invention which allows the user (consumer) to change the frequency of the first local oscillation through VR1 without changing the frequency of the second local oscillation.

According to the preferred embodiment of the present invention, the transmitter unit comprises an automatic electric level regulator to regulate the electric level of the output signal of audio equipment to a predetermined range, a power control circuit controlled by the output signal of the audio equipment to provide the necessary working voltage, and an inductance antenna to transmit output signal from the audio equipment to the receiver unit. The receiver unit comprises an automatic 24-time frequency divider circuit to effectively discriminate left and right sound tracks, and an auto-shut off circuit to automatically cut off power supply when the audio

equipment does work. Furthermore, the transmitter unit and the receiver unit further use a respective dual oscillation frequency regulating circuit consisting of an oscillating transistor, a dielectric resonator, and two variable resistors for regulating the range of the frequency.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a circuit diagram of the transmitter unit of the transmitter-receiver system of the preferred embodiment of the present invention; and

FIG. 2 is a circuit diagram of the receiver unit of the transmitter-receiver system of the preferred embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A transmitter-receiver system in accordance with the present invention is comprised of a transmitter unit installed in the mainframe of an audio equipment, and a receiver unit installed in an earphone. FIG. 1 shows the circuit of the transmitter unit. FIG. 2 shows the circuit of the receiver unit.

Referring to FIG. 1, the automatic electrical level regulator, referenced by 101, is comprised of an electrical level regulating integrated circuit IC3. When the output signal of the mainframe of the audio equipment is received, it is transmitted to the input terminal of the electrical level regulator IC3, which regulates the electrical level of the signal to a standard level and then sends the regulated signal to a posterior signal processing circuit. As the signal processing circuit is not within the scope of the present invention, it is not described in detail. The power control circuit, referenced by 102, is comprised of a comparator and a transistor. When the comparator of the power control circuit 102 receives a signal, the comparator of the power control circuit 102 immediately turns on the transistor, permitting external power supply to be connected to the transmitter unit, to provide it with the necessary working voltage. When the comparator of the power control circuit 102 receives no signal, it immediately turns off the transistor. The dual oscillation frequency regulating circuit, referenced by 103, is comprised of an oscillating transistor OSC, a dielectric resonator DR, and two variable resistors VCA, VCB. The input terminal of the oscillation frequency regulating circuit 103 is connected to the output terminal of the aforesaid signal processing circuit, and the output terminal thereof is connected to the inductance antenna, referenced by 104. The inductance antenna 104 itself is a matching device, therefore no any external matching device is needed.

Referring to FIG. 2, the receiver unit comprises an oscillation frequency regulating circuit (see the left side of FIG. 2). The structure of the input terminal of the oscillation frequency regulating circuit is identical to that of the transmitter unit. The input terminal of the oscillation frequency regulating circuit is connected to the receiving antenna, and the output terminal thereof is connected to the signal processing circuit of the receiver unit. The signal processing circuit of the receiver unit is comprised of an integrated circuit IC-1. The 24-time frequency divider circuit, referenced by 204, is comprised of a resistor R14, capacitors C25, C26, C27, C28, C29, and an oscillator, and connected to the signal processing circuit IC-1 to divide the frequency of the output signal of the signal processing circuit IC-1 by 24, so as to provide a 19 KHz three-dimensional demodulated signal of better left, right sound track discrimination. When the output signal of the signal processing circuit is amplified, it is provided to the speaker of earphone. The

auto-shut off circuit is comprised of an integrated circuit IC-2 and a transistor Q5. The transistor Q5 is controlled by the integrated circuit IC-2 to turned on/off external power supply or battery power supply. The integrated circuit IC-2 can automatically cut off power supply after a predetermined length of time. The working voltage of the receiver unit is designed at a low level about 2.1-3.5V so that battery power consumption can be minimized. 5

It is to be understood that the drawings are designed for purposes of illustration only, and are not intended as a definition of the limits and scope of the invention disclosed. 10

What the invention claimed is:

1. A transmitter-receiver system comprising a transmitter unit installed in an audio equipment, and a receiver unit installed in an earphone, wherein: 15

said transmitter unit comprises:

an automatic electric level regulator, said automatic electric level regulator comprised of an electrical regulating IC, having an input terminal connected to the output terminal of said audio equipment to regulate the electric level of the output signal of said audio equipment to a predetermined range, and an output terminal; 20

a signal processing circuit having an input terminal connected to the output terminal of said automatic electric level regulator, and an output terminal; 25

a dual oscillation frequency regulating circuit, said dual oscillation frequency regulating circuit comprised of an oscillating transistor, a dielectric resonator, a first variable resistor, and a second variable resistor, having an input terminal connected to the output terminal of said signal processing circuit, and an output terminal, a first intermediate frequency output being within 10.7 MH to 100 MH and adjusted by said first variable resistor; 30

- an inductance antenna connected to the output terminal of said dual oscillation frequency regulating circuit, said inductance antenna being a matching device; and
- 5 a power control circuit controlled by the output signal of said audio equipment to provide the necessary working voltage to said transmitter unit, said power control circuit comprised of a comparator and a transistor, said comparator turning on said transistor when receiving a signal from said audio equipment, permitting external power supply to be connected to said transmitter unit;
- 10 said receiver unit comprises:
- a receiving antenna to receive radio signal transmitted from said inductance antenna of said transmitter unit;
- 15 a dual oscillation frequency regulating circuit, the dual oscillation frequency regulating circuit of said receiver unit comprised of an oscillating transistor a dielectric resonator, and two variable resistors, having an input terminal connected to the output terminal of said receiving antenna, and an output terminal;
- 20 a signal processing circuit connected to said oscillation frequency regulating circuit of said receiver unit to process received signal and to provide processed signal to said earphone;
- an automatic 24-time frequency divider circuit, said automatic 24-time frequency divider circuit comprised of a resistor and an oscillator and connected to an IC of the
- 25 signal processing circuit of said receiver unit to divide the frequency of received signal by 24, so as to provide a 19 KHz three-dimensional demodulated signal; and
- 30 an auto-shut off circuit, said auto-shut off circuit comprised of an IC and a transistor, said transistor of said auto-shut off circuit being controlled by the IC of said auto-off circuit to turned on/off external power supply.

\* \* \* \* \*



What the invention claims is:

2. A transmitter for a wireless transmitter-receiver system wherein the transmitter is coupled to audio equipment to transmit an audio signal therefrom comprising:

an automatic audio level regulating circuit comprised of an audio regulating IC, having an input terminal adapted to be connected to the output terminal of said audio equipment to regulate the audio level of an output signal from said audio equipment to a predetermined range, and an output terminal;

a signal processing circuit having an input terminal connected to the output terminal of said automatic audio level regulating circuit, and an output terminal;

an (external and internal) dual adjustable oscillatory frequency regulating circuit comprising an oscillator transistor, and dielectric resonator, a first variable capacitor, a second variable capacitor diode, an input terminal connected to the output terminal of said signal processing circuit, and an output terminal; a first intermediate frequency output being at least about 10MHz adjusted by said first variable capacitor.

an inductance antenna connected to the output terminal of said (external and internal) dual adjustable frequency regulating circuit, said inductance antenna being a matching device; and

a power control circuit controlled by the output signal of said audio equipment to provide the necessary working voltage to said transmitter unit, said power control circuit comprising a

signal amplifier, a comparator and a transistor switch, so that when said signal amplifier receives an input signal from said audio equipment it drives said comparator and transistor switch permitting the connection of an external power supply or battery supply to said transmitting unit.

3. The invention of claim 2 wherein said transmitter unit can be used in a wireless audio transmitting and receiving system, or wireless microphone transmitting system.

4. The invention of claim 2 wherein said automatic audio level regulating circuit comprises an electrical regulating IC, having an input terminal adapted to be connected to an output terminal of said audio equipment to regulate the audio level of the output signal of said audio equipment to a predetermined range, and an output connected to said signal processing circuit.

5. The invention of claim 2 wherein said signal processing circuit has an input terminal connected to the output terminal of said automatic audio level regulator, and an output terminal connected to said (external and internal) dual adjustable oscillatory frequency regulating circuit.

6. The invention of claim 2 wherein said signal processing circuit comprises a 3-dimensinal signal multi-regulating circuit through which +/- 19KHz pilot signals can be regulated and tranmitted to said (external and internal) dual adjustable oscillatory frequency circuit.

7. The invention of claim 2 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit comprises an oscillatory transistor, a dielectric resonator, a first variable capacitor and a second variable capacitor diode, having an input terminal connected to the output terminal of said signal processing circuit, and an output terminal connected to said inductance antenna.

8. The invention of claim 7 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit comprises a first variable capacitor which is internally adjustable.

9. The invention of claim 7 wherein said second variable capacitor diode is externally adjustable by users through frequency controller VR1.

10. The invention of claim 7 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit has a first intermediate frequency output of at least 10MHz and is adjustable by said first variable capacitor.

11. The invention of claim 7 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit includes a : (a) variable resistor (b) variable capacitor, (c) variable electrical sensor or above mentioned combination of (a) (a), (b) (b), (c) (c) , (a) (b), (b) (c), (a) (c).

12. The invention of claim 2 wherein said inductance antenna is connected to the output terminal of said (external and internal) dual adjustable oscillatory frequency regulating circuit, said inductance antenna being a matching device.

13. The invention of claim 12 wherein said inductance antenna provides stable and non-floating wireless audio signals to the receiver unit.

14. The invention of claim 2 wherein said power control circuit is controlled by the output signal of said audio equipment to provide the necessary working voltage to said transmitter unit.

15. The invention of claim 14 wherein said power control circuit comprises a signal amplifier, a comparator and a transistor switch said signal amplifier adapted to receive an input signal from said audio equipment, said comparator and transistor switch connecting an external power supply or battery supply and said transmitter unit.

16. The invention of claim 14 wherein said power control circuit is controlled automatically and manually.

17. The invention of claim 2 wherein said transmitter unit processes an audio signal input in stereo.

18. The invention of claim 2 wherein said transmitter unit further comprises a special noise blocking system for direct connection to a television, compact disc player, automobile audio system or center speaker without interference.

19. The invention of claim 2 wherein said transmitter unit can be used with a plurality of receiving earphones simultaneously.

20. A receiver for a wireless transmitter-receiver system wherein the transmitter is coupled to audio equipment to transmit an audio signal therefrom through an inductance antenna comprising:

a receiving antenna to receive an audio signal transmitted from an inductance antenna of said transmitter unit.

an (external and internal) dual adjustable oscillatory frequency regulating circuit comprising an oscillatory transistor, a dielectric resonator, and a variable capacitor and a variable capacitor diode, an input terminal connected to the output terminal of said receiving antenna, and an output terminal;

a signal processing circuit connected to said (external and internal) dual adjustable oscillatory frequency regulating circuit to process received signals and to provide a processed signal to said earphone.

an automatic 24-time frequency divider circuit comprising a resistor and an oscillator, connected to an IC of said receiver signal processing circuit to divide the frequency of said received signal by 24, so as to provide a 19KHz three-dimensional demodulated signal; and

an auto-shut off circuit comprising an IC and a transistor, said transistor being controlled by said IC to turn a power supply on/off.

21. The invention of claim 20 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit comprises an oscillatory transistor, a dielectric resonator, a first variable capacitor and a second variable capacitor diode.

22. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit has an input terminal connected to the output terminal of said receiving antenna, and an output terminal connected to said signal processing circuit.

23. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit includes a frequency controller VR1 adjustable externally by users.

24. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit has a first intermediate frequency at least above 10MHz.

frequency regulating circuit has the capability to broadly adjust the frequency, and to downconvert

25. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit provides a local oscillatory frequency that can be broadly adjusted without a conventional SAW and which fixes the first local oscillatory frequency and adjusts the second local oscillatory frequency.

26. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency to at least about 10MHz.

27. The invention of claim 20 wherein said signal processing circuit is connected to said external and internal dual adjustable oscillatory frequency regulating circuit.

28. The invention of claim 27 wherein said signal processing circuit is capable of processing received signals and providing processed signals to said receiver unit.

29. The invention of claim 27 wherein said signal processing circuit within which the second local oscillation is adjustable by users or consumers to switch channels.

30. The invention of claim 27 wherein said signal processing circuit is capable of demodulating stereo audio signals to provide high fidelity 19KHz multi-demodulating signals.

31. The invention of claim 20 wherein said auto-shut off circuit is comprised of an integrated circuit and transistors, said auto-shut off circuit being controlled by the IC of said auto-shut off to automatically turn an external power supply or battery supply on and off.

32. The invention of claim 31 wherein said auto-shut off circuit can automatically turn on said receiver unit when it receives an audio signal and automatically turn off said receiver unit when it receives no audio signal.

33. The invention of claim 20 wherein said receiver unit consists of integrated circuits and transistors.

34. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit includes a (a) variable resistor, (b) variable capacitor, (c) variable electrical sensor or above mentioned combination of (a) (a), (b) (b), (c) (c), (a) (b), (b) (c), (a) (c), coupled with a fixed electric resonator, electric capacitor, inductor, dielectric resonator, transistor, mixer and IC to produce a downconverter.

35. The invention of claim 20 wherein said receiver unit is housed in an earphone.

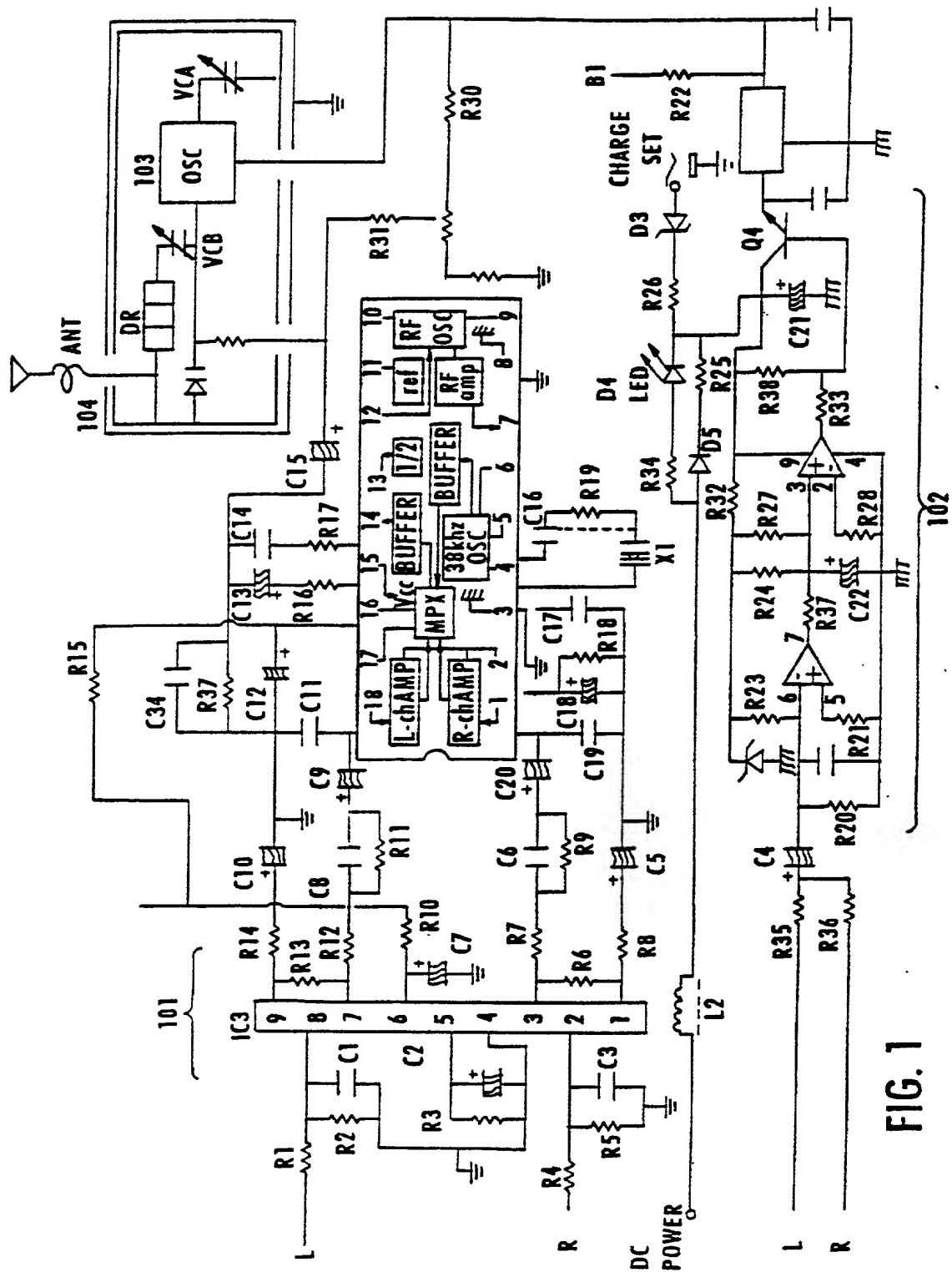
36. The invention of claim 20 wherein said receiver unit can be used in a wireless audio receiving speaker, and wireless microphone.

37. The invention of claim 21 wherein said receiver unit, being wireless, can be positioned or relocated from place to place by users.

[57]

## ABSTRACT

A transmitter-receiver system including a transmitter unit installed in an audio equipment, and a receiver unit installed in an earphone, wherein the transmitter unit includes an automatic electric level regulator to regulate the electric level of the output signal of audio equipment to a predetermined range, a power control circuit controlled by the output signal of the audio equipment to provide the necessary working voltage, and an inductance antenna to transmit output signal from the audio equipment to the receiver unit; the receiver unit is of low working voltage design, including an automatic 24-time frequency divider circuit to effectively discriminate left and right sound tracks, and an auto-shut off circuit to automatically cut off power supply when the audio equipment does no work; the transmitter unit and the receiver unit further use a respective dual oscillation frequency regulating circuit consisting of an oscillating transistor, a dielectric resonator, and two variable resistors for regulating the range of the frequency.







Docket No.: 4006-003

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of :

Jinsaun CHEN :

Serial No. :

Filed: October 1, 1998 :

For: TRANSMITTER-RECEIVER SYSTEM FOR USE IN AN AUDIO EQUIPMENT

**TRANSMITTAL OF VERIFIED STATEMENT**  
**CLAIMING SMALL ENTITY STATUS**

Honorable commissioner of  
Patents and Trademarks  
Washington, DC 20231

Sir:

Transmitted herewith for filing in the above-referenced application is(are) the following:

VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS -

INDEPENDENT INVENTOR

Respectfully submitted,



Donald C. Casey  
Registration No. 24,022

99 Canal Center Plaza, Suite 300  
Alexandria, Virginia 22314  
(703) 548-2131 DCC:slv  
**Date:** October 1, 1998

09164630-100198

Applicant or Patentee: Jinsam CHENAttorney's Docket No.: 4006-003

Serial or Patent No.: \_\_\_\_\_

Filed or Issued: \_\_\_\_\_

For: TRANSMITTER-RECEIVER SYSTEM FOR USE IN AN AUDIO EQUIPMENT**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) and 1.27(c)) - SMALL BUSINESS CONCERN**

I hereby declare that I am

NAME Jinsam CHENADDRESS 2nd FL. No. 8 & 10, Lane 337, Yung Ho Rd, Chung Ho City, Taipei Kien☒ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION Taiwan R.O.CI hereby declare that rights under contract or law have been conveyed to and remain with the individual identified above with regard to the invention, entitled TRANSMITTER-RECEIVER SYSTEM FOR USE IN AN AUDIO EQUIPMENT by inventor(s) Jinsam CHEN described in

- ☒ the specification filed herewith.  
☐ application Serial No. \_\_\_\_\_, filed \_\_\_\_\_  
☐ patent no. \_\_\_\_\_, issued \_\_\_\_\_

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Jinsam CHEN

TITLE IN ORGANIZATION: \_\_\_\_\_

ADDRESS OF PERSON SIGNING: \_\_\_\_\_

SIGNATURE: [Signature]DATE: 1998. 9. 29

REGULAR DECLARATION FORM

Docket No.: 4006-003

**DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought on the invention entitled **TRANSMITTER-RECEIVER SYSTEM FOR USE IN AN AUDIO EQUIPMENT** the specification of which

☒ is attached hereto ☐ was filed on as Application Serial No. and was amended on (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):			Priority Claimed	
Number	Country	Day/Month/Year filed	Yes	No

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

**Prior U. S. Application(s):**

Serial No.	Filing Date	Status: Patented, Pending, Abandoned
08/633,644	April 17, 1996	Patented- U.S. Patent No. 5,722,050

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorney, Donald C. Casey, of

99 Canal Center Plaza, Suite 300  
Alexandria, Virginia 22314

with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to him.

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Full name of sole or first inventor: Jinsaun CHEN

Inventor's signature:



Date: 1998.9.23

Residence: 2<sup>nd</sup> Floor, No. 8 & 10, Lane 337, Yung Ho Road, Chung Ho City, Taipei, Taiwan R.O.C.

Citizenship: Taiwanese

Post Office Address:

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Reissue Application of U. S. Patent No. 5,722,050

Issued: February 24, 1998

Inventor: Jinsaun Chen

SUPPLEMENTAL REISSUE DECLARATION

Honorable Commissioner of Patents and Trademarks

Sir:

Jinsaun Chen declares and says as follows:

1. He is the inventor in the above entitled patent and in this reissue application therefore; and in that capacity executed the attached Inventor's declaration.

2. It has been discovered that U. S. Patent No. 5,722,050, through error and without any deceptive intention, is partly inoperative or invalid by reason of the patentee claiming less than he had a right to claim in the patent.

3. The inventor hereby proffers surrender of such patent upon allowance of this reissue application.

4. The error that renders the patent wholly or partly inoperative or invalid resulted from failure to claim the invention accordingly to claims 2-37 as follow:

What the invention claims is:

2. A transmitter for a wireless transmitter-receiver system wherein the transmitter is coupled to audio equipment to transmit an audio signal therefrom comprising:

an automatic audio level regulating circuit comprised of an audio regulating IC, having an input terminal adapted to be connected to the output terminal of said audio equipment to regulate the audio level of an output signal from said audio equipment to a predetermined range, and an output terminal;

a signal processing circuit having an input terminal connected to the output terminal of said automatic audio level regulating circuit, and an output terminal;

an (external and internal) dual adjustable oscillatory frequency regulating circuit comprising an oscillator transistor, and dielectric resonator, a first variable capacitor, a second variable capacitor diode, an input terminal connected to the output terminal of said signal processing circuit, and an output terminal; a first intermediate frequency output being at least about 10MHz adjusted by said first variable capacitor.

an inductance antenna connected to the output terminal of said (external and internal) dual adjustable frequency regulating circuit, said inductance antenna being a matching device; and

a power control circuit controlled by the output signal of said audio equipment to provide the necessary working voltage to said transmitter unit, said power control circuit comprising a signal amplifier, a comparator and a transistor switch, so that when said signal amplifier receives an input signal from said audio equipment it drives

said comparator and transistor switch permitting the connection of an external power supply or battery supply to said transmitting unit.

3. The invention of claim 2 wherein said transmitter unit can be used in a wireless audio transmitting and receiving system, or wireless microphone transmitting system.

4. The invention of claim 2 wherein said automatic audio level regulating circuit comprises an electrical regulating IC, having an input terminal adapted to be connected to an output terminal of said audio equipment to regulate the audio level of the output signal of said audio equipment to a predetermined range, and an output connected to said signal processing circuit.

5. The invention of claim 2 wherein said signal processing circuit has an input terminal connected to the output terminal of said automatic audio level regulator, and an output terminal connected to said (external and internal) dual adjustable oscillatory frequency regulating circuit.

6. The invention of claim 2 wherein said signal processing circuit comprises a 3-dimensional signal multi-regulating circuit through which +/- 19KHz pilot signals can be regulated and transmitted to said (external and internal) dual adjustable oscillatory frequency circuit.

7. The invention of claim 2 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit comprises an oscillatory transistor, a dielectric resonator, a first variable capacitor and a second variable capacitor diode, having an input terminal connected to the output terminal of said signal processing circuit, and an output terminal connected to said inductance antenna.



8. The invention of claim 7 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit comprises a first variable capacitor which is internally adjustable.

9. The invention of claim 7 wherein said second variable capacitor diode is externally adjustable by users through frequency controller VR1.

10. The invention of claim 7 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit has a first intermediate frequency output of at least 10MHz and is adjustable by said first variable capacitor.

11. The invention of claim 7 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit includes a : (a) variable resistor (b) variable capacitor, (c) variable electrical sensor or above mentioned combination of (a) (a), (b) (b), (c) (c) , (a) (b), (b) (c), (a) (c).

12. The invention of claim 2 wherein said inductance antenna is connected to the output terminal of said (external and internal) dual adjustable oscillatory frequency regulating circuit, said inductance antenna being a matching device.

13. The invention of claim 12 wherein said inductance antenna provides stable and non-floating wireless audio signals to the receiver unit.

14. The invention of claim 2 wherein said power control circuit is controlled by the output signal of said audio equipment to provide the necessary working voltage to said transmitter unit.

15. The invention of claim 14 wherein said power control circuit comprises a signal amplifier, a comparator and a transistor switch said signal amplifier adapted to

receive an input signal from said audio equipment, said comparator and transistor switch connecting an external power supply or battery supply and said transmitter unit.

16. The invention of claim 14 wherein said power control circuit is controlled automatically and manually.

17. The invention of claim 2 wherein said transmitter unit processes an audio signal input in stereo.

18. The invention of claim 2 wherein said transmitter unit further comprises a special noise blocking system for direct connection to a television, compact disc player, automobile audio system or center speaker without interference.

19. The invention of claim 2 wherein said transmitter unit can be used with a plurality of receiving earphones simultaneously.

20. A receiver for a wireless transmitter-receiver system wherein the transmitter is coupled to audio equipment to transmit an audio signal therefrom through an inductance antenna comprising:

a receiving antenna to receive an audio signal transmitted from an inductance antenna of said transmitter unit.

an (external and internal) dual adjustable oscillatory frequency regulating circuit comprising an oscillatory transistor, a dielectric resonator, and a variable capacitor and a variable capacitor diode, an input terminal connected to the output terminal of said receiving antenna, and an output terminal;

a signal processing circuit connected to said (external and internal) dual adjustable oscillatory frequency regulating circuit to process received signals and to provide a processed signal to said earphone.

an automatic 24-time frequency divider circuit comprising a resistor and an oscillator , connected to an IC of said receiver signal processing circuit to divide the frequency of said received signal by 24, so as to provide a 19KHz three-dimensional demodulated signal; and

an auto-shut off circuit comprising an IC and a transistor, said transistor being controlled by said IC to turn a power supply on/off.

21. The invention of claim 20 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit comprises an oscillatory transistor, a dielectric resonator, a first variable capacitor and a second variable capacitor diode.

22. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit has an input terminal connected to the output terminal of said receiving antenna, and an output terminal connected to said signal processing circuit.

23. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit includes a frequency controller VR1 adjustable externally by users.

24. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit has a first intermediate frequency at least above 10MHz.

frequency regulating circuit has the capability to broadly adjust the frequency, and to downconvert

25. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit provides a local oscillatory frequency

that can be broadly adjusted without a conventional SAW and which fixes the first local oscillatory frequency and adjusts the second local oscillatory frequency.

26. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency to at least about 10MHz.

27. The invention of claim 20 wherein said signal processing circuit is connected to said external and internal dual adjustable oscillatory frequency regulating circuit.

28. The invention of claim 27 wherein said signal processing circuit is capable of processing received signals and providing processed signals to said receiver unit.

29. The invention of claim 27 wherein said signal processing circuit within which the second local oscillation is adjustable by users or consumers to switch channels.

30. The invention of claim 27 wherein said signal processing circuit is capable of demodulating stereo audio signals to provide high fidelity 19KHz multi-demodulating signals.

31. The invention of claim 20 wherein said auto-shut off circuit is comprised of an integrated circuit and transistors, said auto-shut off circuit being controlled by the IC of said auto-shut off to automatically turn an external power supply or battery supply on and off.

32. The invention of claim 31 wherein said auto-shut off circuit can automatically turn on said receiver unit when it receives an audio signal and automatically turn off said receiver unit when it receives no audio signal.

33. The invention of claim 20 wherein said receiver unit consists of integrated circuits and transistors.

34. The invention of claim 21 wherein said (external and internal) dual adjustable oscillatory frequency regulating circuit includes a (a) variable resistor, (b) variable capacitor, (c) variable electrical sensor or above mentioned combination of (a) (a), (b) (b), (c) (c), (a) (b), (b) (c), (a) (c), coupled with a fixed electric resonator, electric capacitor, inductor, dielectric resonator, transistor, mixer and IC to produce a downconverter.

35. The invention of claim 20 wherein said receiver unit is housed in an earphone.

36. The invention of claim 20 wherein said receiver unit can be used in a wireless audio receiving speaker, and wireless microphone.

37. The invention of claim 21 wherein said receiver unit, being wireless, can be positioned or relocated from place to place by users.

5. The error arose as follows:

A. Applicant-Patentee is a citizen of the Republic of China, whose address is 2F1., No. 8 & 10, Lane 337, Yung Ho Road, Chung Ho City, Taipei Hsien, Taiwan.

B. Being unfamiliar with United States patent practice he engaged the services of Harvard Patent & Trademark, a firm owned by Mr. Wei-Hsing Cheng, 10<sup>th</sup> Floor, No. 91, Roosevelt Road, Sec.2, Taipei, Taiwan to initially prepare the parent patent application herein. Neither Mr. Cheng or any of his employees are authorized to practice before the United States Patent and Trademark Office.

C. Mr. Cheng prepared the application and the application was filed through Donald C. Casey, a patent attorney located at 99 Canal Center Plaza, Suite 300, Alexandria, Virginia, 22314, registration number 24,022. Mr. Casey was not authorized to revise or otherwise prepare claims covering the invention because the inventor and his Chinese counsel were not aware that broader coverage should have been sought based upon the invention and known prior art.

D. The case as filed contained only a single claim claiming all elements of the instance invention in detail and that claim resulted in the only claim in the above identified patent.

E. Subsequent to the issue of that patent, potential infringing devices were discovered on sale in the United States and the advice of Mr. Casey was sought concerning infringement. Mr. Chen was then informed by Mr. Casey, for the first time in the early of summer 1998, that infringement most likely would not be present because the single claim was too narrow. He was advised that the patent specification would support a spectrum of claims from broad to narrow. He then engaged the services of Aiesha Chien to prepare draft claims which were submitted to Mr. Casey for revision resulting in the instant claims 2-37, and directed the preparation of this reissue application in order to correct the error resulting in the above entitled patent whereby he claimed less than he had a right to claim.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title



1998.9.23

[illegible]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re: Reissue Application of U. S. Patent No. 5,722,050

Issued: February 24, 1998

Inventor: Jinsaun Chen

SUPPLEMENTAL REISSUE DECLARATION

Honorable Commissioner of Patents and Trademarks

Sir:

Aiesha Chien declares and says as follows:

1. She was employed by Mr. Jinsaun Chen in the early summer of 1998 to prepare draft claims of a spectrum from broad to narrow covering the invention as described in the specification of U. S. Patent No. 5,722,050. She prepared the draft and submitted it to Mr. Donald C. Casey who further revised the claims and advised that the revised claims were supported by the instant specification.

2. She has read the attached declaration of the inventor, Jinsaun Chen, and on information and belief corroborates the facts stated therein.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title



18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

  
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AIESHA CHIEN

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